

## **Engineering Analysis**

Solutia Inc.

Facility No. 301-0007

CO Monitor Removal

On December 1, 2017, Solutia Inc. submitted an air permit application requesting that the facility be authorized to modify Permit No. 301-0007-X010 to remove the requirement to utilize a continuous emissions monitor system (CEMS) to record the carbon monoxide (CO) emissions from the exhaust stack of the 75 MMBtu/hr Process Steam Boiler with By-Product Fuel Firing Capacity ("boiler") at the facility in Anniston, Alabama. The facility has also requested to be allowed to fire off-specification used oils in the boiler. Solutia is currently considered a minor source with respect to Title V and PSD. Additional information was received on March 8, 2018.

### **Background**

The boiler is currently permitted to burn natural gas, "waste" heat transfer fluid, and aviation hydraulic fluids. The facility currently receives waste heat transfer fluid and aviation hydraulic fluids through a customer return program. The fuels are blended together and fired in the boiler.

In order to ensure that the facility meets the requirements for "on-specification used oil", the facility has historically monitored the carbon monoxide concentration of the exhaust from the boiler. Permit Proviso No. 9 of Permit No. 301-0007-X010 states:

"The following operating parameters will be monitored and recorded continuously. Continuous monitoring shall be defined as: Data points taken at intervals of one minute, averaged over a fifteen minute period.

- a) CO levels in the exhaust gas from the boiler;
- b) O<sub>2</sub> levels in the exhaust gas from the boiler;
- c) Temperature of the exhaust gas;
- d) By-product fuel factoring

An alarm shall be installed and maintained which will automatically sound whenever the O<sub>2</sub> content of the boiler exhaust falls below 5 percent. An automatic shut-off device will be installed and maintained so that firing of by-product fuel in the boiler shall automatically cease whenever one of the following parameters is exceeded over the fifteen minute rolling average:

- a) The exhaust O<sub>2</sub> level falls below 3.0 percent;
- b) The exhaust CO level exceeds 50.0 percent; or
- c) The temperature of the exhaust gases leaving the boiler falls below 225 °F.

Continuous monitoring results shall be recorded in a manner suitable for inspection. Such records shall be kept for at least two years from the date of the measurement.”

Additionally, Solutia modified Permit No. 301-0007-X010 in 2007 (see engineering analysis dated June 18, 2007) to address the “used oil” specifications listed in Table 1 of 40 CFR 279.11. Permit Proviso No. 13 of Permit No. 301-0007-X010 states “The waste heat transfer and aviation hydraulic fluids shall meet the limits as described in Table 1 for used oil specifications under 40 CFR 279.11. The sulfur content shall be met by the requirements in proviso no. 12.” Furthermore, Proviso No. 14 states, “The waste heat transfer fluids burned as alternate fuel shall be limited to that described in the letter dated May 17, 2007. Prior written approval will be required to burn any alternate fuel that does not meet the specifications in Attachment 1 of the May 17, 2007 letter.”

### **Process Change**

Due to the redundant requirements of the previously stated provisos and the requirements of 40 CFR Part 63, Subpart JJJJJJ (see “MACT” section below); and the operational and maintenance concerns with the CO monitor, Solutia is requesting to monitor fuel input to the boiler as an alternative to the stack CO monitor. In order to ensure that the emissions from the facility remain below major source thresholds, the facility has also conservatively proposed to limit the amount of used oil fired in the boiler to 2,000,000 (2 million) gallons per year. Additionally, the facility has proposed to remove the requirement to fire only on-specification oil in the boiler.

### **Emissions**

Solutia has calculated the emissions from the boiler using AP-42 factors. The emissions from the boiler are listed in the table below. It is noted that the facility calculated emissions using the requested fuel limit. The Department’s calculations assuming 8,760 hours of firing the blended fuel are also included. Additionally, Solutia has stated that the PM emissions would be negligible from each fuel fired in the boiler. In order to conservatively estimate the potential PM emissions from the boiler, the emissions were calculated utilizing the maximum allowable from the equation for fuel burning equipment found in ADEM Admin. Code r. 335-3-4-.01 (see “SIP” section below).

<b>Pollutant</b>	<b>Emissions (TPY)<sup>1</sup> 2 MM gallons of Fuel</b>	<b>Emissions (TPY)<sup>2</sup> 8,760 hours</b>
PM	N/A	0.16
NO <sub>x</sub>	37.08	42.0
SO <sub>2</sub>	71.1	151.3
CO	19.35	10.7

Note 1: Emissions include 2 MMgallons of fuel oil input and approximately 341.76 MMscf/yr of natural gas for a total of 657,000 MMBtu/yr (75 MMBtu/hr at 8,760 hours) heat input.

Note 2: Emission from blended fuel input only for 8,760 hours.

## **PSD**

Solutia is currently considered a minor source with respect to PSD. In order for a source to be classified as major source with respect to PSD, the potential emissions would be required to be greater than 100 TPY. As indicated in the table above, Solutia has proposed to limit the amount of fuel fired in the boiler in order to remain below major source thresholds. Therefore, the facility would be classified as a minor source with respect to PSD, and no PSD review would be required.

## **NSPS/MACT/NESHAP**

### **40 CFR Part 60, Subpart Dc**

Solutia is not expected to physically modify the boiler or change the method of operation of the boiler. The facility would only be changing the monitoring and compliance indicator associated with the boiler. Since this project would not meet the definition of a modification (as defined in 40 CFR 60.2), the boiler would not be subject to the requirements of 40 CFR Part 60, Subpart Dc.

### **40 CFR Part 60, Subpart JJJJJ**

The boiler is currently subject to the requirements of 40 CFR Part 63, Subpart JJJJJ, “National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources.” The unit is classified as an existing source with respect to Subpart JJJJJ. In order for the boiler to be considered a reconstruction, the proposed project must meet the definition of reconstruction in 40 CFR 63.2 as stated in 40 CFR 63.11194(d).

Solutia has stated that the proposed project would not result in a capital expenditure (as defined in 40 CFR 63.2); therefore, the boiler would remain an existing unit with respect to Subpart JJJJJ. As indicated in Table 2 of 40 CFR Part 63, Subpart JJJJJ for existing oil fired boilers with an oxygen trim system, the boiler is required to conduct an initial

tune-up and conduct a tune-up of the boiler every 5 years. No additional requirements would be applicable.

## **SIP**

### **ADEM Admin. Code r. 335-3-4-.03: Fuel Burning Equipment**

The boiler would be subject to the PM emission limitation requirements of ADEM Admin. Code r. 335-3-4-.03. The boiler would be limited to the PM emissions calculated using the following equation.

$$E=1.38H^{-0.44}$$

Where,

E = Emissions in lb/million Btu

H = Heat Input in millions of BTU/hr

Using the boiler capacity of 75 MMBtu/hr ( $75 \times 10^6$  BTU/hr), the PM emissions from the boiler would be limited to  $4.73 \times 10^{-4}$  lb/MMBtu (.04 lb/hr or 0.16 TPY).

### **ADEM Admin. Code r. 335-3-5-.01: Fuel Combustion**

The boiler would be subject to the emission limitations for sulfur dioxide (SO<sub>2</sub>) from fuel combustion as stated in ADEM Admin. Code r. 335-3-5-.01(1)(a). The facility would be required to limit the SO<sub>2</sub> emissions from the boiler to 1.8 lb/MMBtu.

### **ADEM Admin. Code r. 335-3-3-.05: Incineration of Commercial and Industrial Solid Waste (CISWI)**

Solutia has stated that the boiler fires used heat transfer fluid and aviation fluid manufactured by the facility. The used fluids are returned by the facility's customers through a recycling program. Since the boiler currently burns additional fuels, the Department reviewed the applicability of CISWI to the unit.

A CISWI unit is defined in ADEM Admin. Code r. 335-3-3-.05(1)(r) as "any distinct operating unit of any commercial or industrial facility that combusts, or has combusted in the preceding 6 months, any solid waste as that term is defined in 40 CFR Part 241. If the operating unit burns material other than traditional fuels as defined in §241.2 that have been discarded, and the owner or operator does not keep and produce records as required by subparagraph (l)(u) of this rule, the operating unit is a CISWI unit..."

Traditional fuels is defined in 40 CFR 241.2 as “materials that are produced as fuels and are unused products that have not been discarded and therefore, are not solid wastes, including: (1) Fuels that have been historically managed as valuable fuel products rather than being managed as waste materials, including fossil fuels (e.g., coal, oil, and natural gas), their derivatives (e.g. petroleum coke, bituminous coke, coal tar oil, refinery gas, synthetic fuel, heavy recycle, asphalts, blast furnace gas, recovered butane, and coke over gas) and cellulosic biomass (virgin wood); and (2) alternative fuels developed from virgin materials that can now be used as fuel products, including used oil which meets the specifications outlined in 40 CFR 279.11...”

Used oil is defined in 40 CFR 279.1 as “any oil that has been refined from crude oil, or any synthetic oil, that has been used and as a result of such use is contaminated by physical or chemical impurities.” Solutia has previously determined that the used heat transfer fluids returned by customers would be considered used oil as defined above (see correspondence dated May 17, 2007). Since the boiler would fire material that is included in the definition of a traditional fuel, the unit would not be subject to the requirements of ADEM Admin. Code r. 335-3-3-.05.

#### Part 279: Standards for the Management of Used Oil

40 CFR 279.11 states “Used oil burned for energy recovery, and any fuel produced from used oil processing, blending, or other treatment, is subject to regulation under this part unless it is shown not to exceed any of the allowable levels of the constituents and properties shown in Table 1.” Table 1 of 40 CFR 279.11 is included below.

Constituent/Property	Allowable Level
Arsenic	5 ppm maximum
Cadmium	2 ppm maximum
Chromium	10 ppm maximum
Lead	100 ppm maximum
Flash Point	100 F minimum
Total halogens	4,000 ppm maximum <sup>1</sup>

Table 1 of 40 CFR 279.11

Note 1: Halogen concentrations greater than 1,000 ppm are considered hazardous waste.

Solutia has proposed to be allowed to fire on-specification and off-specification used oil in the boiler. The requirements for each are detailed in the following sections.

### **On-Specification Used Oil**

40 CFR 279.11 states “...Once used oil that is to be burned for energy recovery has been shown not to exceed any allowable level and the person making that showing complies with 279.72, 279.23, and 279.74(b), the used oil is no longer subject to this part.”

40 CFR 279.72(a) states “...burner may determine that used oil that is to be burned for energy recovery meets the fuel specifications of 279.11 by performing analyses or obtaining copies of analyses or other information documenting that the used oil fuel meets the specifications. Additionally, 40 CFR 279.72(b) states, “...burner who first claims that used oil that is to be burned for energy recovery meets the specifications for used oil fuel under 279.11, must keep copies of analyses of the used oil (or other information used to make the determination) for three years.” Since Solutia would be the first to claim that the used oil would meet the specifications of used oil under 279.11, the facility would be required to maintain records of the analyses performed to ensure that the used oil meets the on-specification requirements of 279.11 for a period of three (3) years.

40 CFR 279.74(b) states “...burner who first claims that used oil that is to be burned for energy recovery meets the fuel specifications under §279.11 must keep a record of each shipment of used oil to the facility to which it delivers the used oil. Records for each shipment must include the following information:

- (1) The name and address of the facility receiving the shipment;
- (2) The quantity of used oil fuel delivered;
- (3) The date of shipment of delivery; and
- (4) A cross-reference to the record of the used oil analyses or other information used to make the determination that the oil meets the specification as required under §279.72(a).

Since Solutia would be the first facility to claim that the used oil meets the fuel specifications under 279.11, the facility would be required to keep the records listed above. As indicated in 279.11(c), the records must be retained for a period of at least three years.

### **Off-Specification Used Oil**

As stated in 40 CFR 279.61(b)(1), “...used oil burners may not process used oil unless they also comply with the requirements of Subpart F of this part.” Solutia has stated

that the used oil returned by customers (on-specification and off-specification) would be blended with diesel fuel and other used oil before firing in the boiler. 40 CFR 279.61(b)(2) states “Used oil burners may aggregate off-specification used oil with virgin oil or on-specification used oil for purposes of burning, but may not aggregate for purposes of producing on-specification used oil.” Therefore, Solutia would not be subject to the requirements of Subpart F of 40 CFR Part 279; however, records of the off-specification would be required even when mixing the fuels.

When firing off-specification fuel, Solutia would be subject to the requirements of 40 CFR Part 279, Subpart G – Standards for Used Oil Burners who Burn Off-Specification Used Oil for Energy Recovery.

### **SMOP**

Since the potential uncontrolled emissions would be greater than the major source thresholds and the facility has proposed a limit of the amount of blended fuels fired in the boiler in order to remain below major source thresholds, the facility would be classified as synthetic minor source with respect to Title V. The permit would be required to undergo a 15 day public notice period.

### **Recommendations**

Since it appears that there would not be a significant increase in emissions from this project and all affected units would still be capable of meeting all State and Federal Regulations, I recommend that Synthetic Minor Permit No. 301-0007-X023 be issued for the modification to the 75 MMBtu/hr Process Steam Boiler with By-Product Fuel Firing Capacity. A description of the permit is included below.

301-0007-X023 – 75 MMBtu/hr Natural Gas and Used Oil Fired Process Steam Boiler

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Draft  
Date